Welcome. You've made a good decision to view this instructional module prepared especially for ARS scientists who are beginning to write their research project plans and will have them evaluated by expert panels.

This training module assumes you have completed your prospectus, but if you have not, it should still be beneficial as it will preview the next step for you. The next two months you spend developing your project plan are important to the success of your research and the Agricultural Research Service.

At the beginning of this video, you will get instruction on "**How to Write Your Best Project Plan**." The project plan will take a significant amount of time and effort to develop as you further define the research objectives outlined in the prospectus. We'll discuss each section required in the project plan. Then we'll discuss the action classifications and the post-review process. Finally, the importance and benefits of the ARS Peer Review Process will be considered along with the roles played by research leaders, national program leaders, and your area office.
As you watch the program, it will be desirable (but not essential) to have with you several items that are available from the Office of Scientific Quality Review's Website. Go to **WWW.ARS.USDA.GOV/OSQR** to obtain

The Project Plan Instructions and Tips
The Peer Review Manual, and
The Script for this Program.

You can also request examples of well-written project plans from your Area Office or National Program Leader.

We will now begin the instructional segment of this program. The project plan instructions and tips will be useful for this segment. Begin laying out your project plan by first developing an outline for each required section. Read the "Project Plan Instructions" to understand each section that is needed. At this point you should recognize the page limits and suggested page lengths for each section of the project plan.
By now your National Program Team and Area management have agreed to the objectives of your research project as described in the prospectus. Here are a few general comments as you prepare to write your plan:
•The process takes time—plan ahead, start early!
•The peer review is rigorous—plan to put in the effort required.
• and finally, take this process seriously.

Become familiar with the criteria that reviewers will use to evaluate your plan. A sample peer review form is available in the Peer Review Manual. Reviewers will be evaluating your plan using three main criteria:**Merit and Significance** refers to whether the project will lead to the development of new and important knowledge and technology. Projects must also be relevant to the National Program Action Plan.
The **Approach and Procedures** section will be evaluated in terms of the technical and scientific quality of the experimental plan.
The third criterion, **Probability of Success,** deals with feasibility of the project, given the scientist's backgrounds and areas of expertise, and the facilities that are available. Moreover, the objectives must be attainable within the timeframe of the project.

Let's take a closer look at how the three review criteria relate to the characteristics of a good project plan. Regardless of the area of research, a good project plan will have certain characteristics.
A GOOD Project Plan Will:

•Clearly state the problem(s) to solve or question(s) to address.
• it will demonstrate the project is important, and
• it will state how new technology or fundamental knowledge will result.
Collectively, these will contribute to a project plan that has high merit and significance.With respect to the second criterion…

A GOOD Project Plan Will:
•Have interrelated objectives and provide a clear, conceptual framework for their development,
• it will use illustrations to explain the Plan,
• it will describe what research will be done, how, by whom, and expected results, and
• it will have thoughtful contingencies.

Collectively, these will contribute to a plan that has high quality approaches and procedures, or in other words, a high quality experimental plan.

With respect to the third criterion
A GOOD Project Plan Will:
•Establish that the scientists involved have the necessary experience and qualifications.
This can be established with preliminary data, scientist's publications, or can be contributed by collaborators that are identified in the plan.
• It will establish that necessary facilities and equipment are on hand, and
• it will show plans to fill any vacancies that may exist or to acquire of needed equipment or facilities.

Collectively, these will contribute to a project plan that has a high probability of success.

Finally, a good project plan will….
•Make it clear that the research is not done in isolation.
• it will show awareness of, and coordination with, other research groups within and outside of ARS, and
• it will have collaborators and utilize resources available within the scientific community, such as databases.

Now let's talk more specifically about the project plan itself.
Read the "Project Plan Instructions" to understand each section that is needed. At this point you should recognize the page limits and suggested page lengths for each section of the project plan.
Not including the first four pages, project plans vary between 15 and 25 pages. The number of pages is determined by the scientific years for the Category One and Four scientists assigned to the project. In addition, up to 2 pages may be added for schematic diagrams and tables. Consider using the appendices for explanatory information you believe is necessary, but not a priority for the body of the project plan.

The first page of the project plan is the 'cover page', which contains the administrative information used for tracking and identifying your project. The title should not exceed 140 characters to comply with the character limit in the ARS project management system. You are to list only the category one and four scientists, one of which must be identified as the lead scientist. Total scientific years of the research team must be shown and is used to determine the number of pages allowed for the body of the project plan. And finally, the duration for project plans is based on the Panel Peer Review Schedule. Panels convened within their scheduled year, review plans that have a 5-yr duration. If your project is scheduled for an ad hoc review, the duration of the project may be anywhere from 2 to 4 years. The OSQR website includes the Peer Review Schedule and directions for setting the duration of project plans.

The second page is the table of contents, which is shown here. It is included as a service to anyone signing or reviewing your plan. This is also a useful checklist to insure that all required sections are included. Note that the first four pages are numbered with lower case Roman numerals. The body of the project plan, shown here in the red box, can range from 15 to 25 pages, depending on the number of scientific years involved.

The "Signature Page" follows on page "iii", (in lower case Roman numerals), and defines the role of each person signing off on the plan. Prior to submitting your project plan to OSQR, your Area Program Analyst will ensure that a signature is obtained from the Research Leader, Center, Institute, or Lab Director, National Program Leader, and the Area Director.

The Project Summary is contained on the fourth page. The objectives and research approaches of the project plan should be summarized in 250 words or less. The summary should 'stand alone' and convey to the reader the scope and importance of the work, and what the expected outcomes will be.

The objectives section is the first page of the body of the project plan and is numbered with Arabic numeral "1." State the overall or clarifying theme of the research. In addition, state the objectives and sub-objectives (if any). You can also provide a brief description of the experimental approaches that will be used to address the objectives. Remember, objectives should be relevant to a component of the National Program Action Plan that can be accomplished in five years or less.

We will now continue to discuss, in turn, the required sections that constitute the project plan.

The 'Need for Research' section identifies the problems to be solved and the questions to be addressed in relation to the national needs identified in your National Program Action Plan. Often, too much space is devoted to this section. Keep this section short and to the point. If your project falls within the National Program Action Plan, it is relevant and justified. Include only concise statements of the purpose, the project's potential benefits and products. Identify your customers and if a specific Congressional mandate provides the justification for your work, it can be mentioned here. However, this applies in relatively few cases.

In general, plan to use 5-6 pages to write the 'Scientific Background' section. Avoid repeating anything that was previously stated in the Need for Research. Your goal is to discuss the scientific literature and technology to the degree that you demonstrate your knowledge and understanding of the field of study. The Scientific Background should make it easy for reviewers

to associate objectives with background information and the need for the research. It is helpful if you use subheadings within the Scientific Background that correspond to the objectives.

The scientific background section should present the literature relevant to this research project plan. Remember, it is not an exhaustive literature review, but rather a critical review of relevant literature. **What is known and not known about this area of research?**If there are opposing views in the literature search, show that you are aware of those views.

Most importantly, which gaps in information or technology will be filled by this research? This should provide a logical foundation for the development of the objectives identified in the plan.

You can also include preliminary data that help provide the background for your plan. If you mention preliminary results, it is a good idea to show some data using tables, figures, or photographs.

Your proposed work should be unique and distinctive. However, if closely related work exists, show how your efforts fit into the bigger picture. In particular, show "awareness" of similar ARS projects and efforts to coordinate where possible. Never omit information about similar research in progress.

You might also try providing a schematic figure here showing interrelationships among objectives (or sub-projects) and also with other CRIS [pronounced like "Chris"] projects. For example, if scientists within the same management unit are contributing to two different CRIS projects, show how these two projects interrelate. Combining a diagram with the narrative can make a big difference in how non-ARS scientists interpret your plan and begin to appreciate the full scope of research within your management unit.

Remember, up to 2 pages of illustrations can be used and do not count against page limits. Illustrations can be effectively utilized both in the scientific background and in the Approach and Procedures section.

The 'Approach and Procedures' section constitutes the experimental design portion of your project plan and ranges from 6 to12 pages. Your goal is to demonstrate that you can address and achieve the stated objectives. You want to tell who is going to do which research, how they are going to do it and when.

Remember, scientists are most often criticized for not providing enough detail in this section to convince reviewers that their project is capable of being highly successful.

Your project plan should **explicitly describe each objective.** Although this section can be arranged several different ways, the recommended way is to provide for each objective:
-a statement of the hypotheses being tested. (If research is hypothesis-driven, some research is not.)
-the experimental approaches that will be undertaken to test the hypotheses or address the objective.
-and finally, a 'procedures' section that describes the methods to be used and provides the critical details.

You may have a few related objectives, one leading objective with several sub-objectives, or several loosely-related objectives, explicitly described in this section.

Here are some additional points you should keep in mind.

Contingencies and collaborations can be identified within each objective or can be included as separate sub-sections at the end of the 'approaches and procedures' section. You may find it necessary to **use the appendices** to supplement this section.

The art of crafting a well-conceived project plan involves using good judgment in how detailed the contingency section should be.

Contingency plans should be developed for each objective; discuss the level of detail needed in the contingency plan with your research leader to arrive at a conclusion on how long this section should be and the role contingencies play in the overall success of your review. In general, never say there are NO contingencies.
Clearly define all collaborations with ARS and non-ARS labs. Include detailed collaboration letters and other documents as an appendix. If a collaborative agreement is under development, mention it also. Minority-coded ARS projects that support your research should also be referenced.

Identify by name the scientists involved with each objective or sub-project, and generally identify other staff (eg. Post docs, technicians, and students.) If there is a critical vacancy, or essential equipment is lacking, you should discuss strategies to fill the vacancy or purchase the equipment.

No detailed **budget or funding information** is needed in the project plan, but you may want to assure reviewers that the scope and design of the plan is within the range of your budget. If you haven't already, disclose if an objective is supported by **competitive grants**.

The 'Milestones and Expected Outcomes' section is intended to be the series of significant events you anticipate will occur over the life of your plan. They can be included after each objective or combined together into one section following the approach and procedures. In some cases, scientists opt to present a timetable of activities as shown here. However, this is not intended to be simply a "to-do" list of the work plan your research team has devised. Your goal is to use a chart or table to identify which major successes your research team will produce, when, and by whom.

There is no need to create fixed increments of time between milestones, but you must show realistic points over the duration of the plan that you believe the milestones will occur. Finally, consider tying in the contingency plans you have in case the anticipated milestones do not occur. Several examples of milestones are available on the OSQR website within the instructions for writing project plans.

The 'Milestones and Expected Outcomes' section concludes the main body of the project plan, but several other required sections follow, shown here in the red box. We will discuss, in turn, each of the final required sections.

Literature cited: Only the citations referenced within your plan should be listed here. Literature can be listed alphabetically or in the order it appears within the plan. Any format can be used, but be sure to include titles of publications. List only publications or items in press.

Past Accomplishments of Investigators: Use one single-spaced page or less, per scientist. Provide education and work experience, and describe accomplishments of the investigator(s) of this project over the past 10 years that are significant and pertinent to the proposed research. Include each scientist's peer-reviewed publications of the past 5 years and all publications that are clearly relevant to this research project during the past 10 years.

Health, Safety, and Other Issues of Concern Statements: Address the seven specified safety and health concerns including identification of necessary permits either in hand or requested. These include OSHA, laboratory hazards, animal care, and environmental requirements.

Appendices: Letters of collaboration should be included here, as well as any other supplementary materials that are essential to the plan.

Your Area Program analyst will assist you in handling basic formatting procedures and checking that each section has been completed. Consider getting additional input from fellow scientists on the flow of the plan, its clarity, and scientific merit. If written by a team, make sure the final document is as seamless as possible. A polished document indicates you took the time to prepare a respectable plan and you have taken the peer review seriously. Once you have completed your draft project plan, your research leader and Area Office will review it and begin the approval process.

After your project plan is approved for peer review through administrative channels, it will be forwarded to OSQR. Once the peer review panel evaluates your project plan, you will receive a written set of panel recommendations and the composite action classification of your plan. Following this discussion of action classes, you may also want to read the Action Class Matrix (found in the Peer Review Manual), that will be given to peer reviewers prior to completing their review of your project. Action classes describe the level of modification that's necessary in order for the project plan to meet quality standards. Most project plans will receive some suggestions for improvement. Action classes are extremely important because they determine what happens after the panel meeting. The five action classes are:

No revision required

Minor revision required
Moderate revision required
Major revision required and
Not feasible

Let's take a closer look at each of the action classes.

No Revision Required: The objectives are important to the national interest and closely fit the national program action plan. The objectives and experimental plan are well conceived and the project plan is clearly articulated. The approaches identified directly target the stated goals and

involve the most appropriate experimental procedures. Needs no revision, but minor changes to the project plan might be made.

Minor Revision Required: The objectives are important to the national interest and fit the national program action plan. The experimental plan is generally well conceived and all of the objectives are sound. The project plan is feasible but some changes to one or more objectives are suggested.

Projects that receive a 'No Revision' or 'Minor Revision' action class are often good examples for you to follow. Don't hesitate to ask your Area Office and National Program Leaders to get examples that most closely match the design your plan will have.
Take notice of how the approaches, procedures, and milestones are presented for each objective in a well-crafted project plan.

Moderate Revision Required: The objectives are relevant to the national program action plan and fit the stated project goals. Some revision to one or more objectives is needed, and may involve changes to the experimental approaches. The project plan may need some rewriting for greater clarification. The project is basically feasible as written but requires some revision to increase quality to a higher level. The No Revision, Minor Revision, and Moderate Revision action classes are the most favorable action classes. When project plans receive one of the top 3 action classes, the scientists are given 6 weeks to revise their plans according to the recommendations and to write a formal response to each recommendation. Upon receiving a certification letter from the Office of Scientific Quality Review, your Area Office and National Program Staff will coordinate the renewal of your CRIS project.

Major Revision Required: One or more of the objectives do not fit the stated goals and/or are not completely relevant to the national program action plan. The project plan may need significant rewriting in order to be clearly articulated. Substantial revision to one or more objectives may be necessary because of inappropriate hypotheses, or inadequate experimental approaches. However, the project should be sound and feasible after significant revision.

Not Feasible: The project plan has major flaws that require a complete redesign and rewrite. The objectives may not fit within the national program action plan, or the project is not feasible because of substantive deficiencies in essential expertise and/or facilities. The project plan as outlined cannot be simply revised to produce a sound project.

Plans that receive a "Major Revision" or "Not feasible" action class are reviewed a second time, unless postponed for the next review session or terminated. The quality of your project plan, as well as your overall use of the peer review process to improve your plan, will be considered in your performance evaluation.

Preparing a well-crafted project plan takes considerable time and effort, but is worthwhile given the many benefits that can accrue.

The Peer Review Process is an opportunity for ARS scientists to place their work before members of the scientific community and inherently promote an exchange of ideas and new approaches to solving agricultural problems.

The Peer Review Process is a key aspect of ARS's research from the programmatic level to each individual research project.

Half of the four months you spend writing your project plan will be used to gain input from your research leader, National Program Leader, and Area Director's staff. The following ARS representatives have a critical message for you as you prepare for this exchange of ideas and guidance.

Research leaders also contribute to the scope and direction of the project…

ARS Area Directors oversee each scientists' participation in the peer review process, especially to ensure that scientists are accountable for the development of project plans, consideration of panel recommendations, and maintaining their plans over the next five years. The Area Office can also play an important and helpful role during the preliminary planning stage.

ARS scientists are encouraged to take advantage of this opportunity to gain useful suggestions for improving their project plans.